Claims

1. An RNA polymerase consisting of a wild type RNA polymerase at least one of amino acids in the wild type RNA polymerase is modified to enhance its ability for incorporating 3'-deoxyribonucleotides and derivatives thereof in comparison with the corresponding wild type RNA polymerase.

2. The RNA polymerase of claim 1, wherein at least one amino acid present in a nucleotide binding site of the wild type RNA polymerase has been modified.

3. The RNA polymerase of claim 2, wherein the modification of amino acid is substitution, insertion or deletion of amino acid.

4. The RNA polymerase of ~~any one of claims 1-3,~~ claim 1 wherein at least one amino acid present in the nucleotide binding site of the wild type RNA polymerase is replaced with tyrosine.

5. The RNA polymerase of claim 4, wherein the replaced amino acid is phenylalanine.

6. The RNA polymerase of ~~any one of claims 2-5,~~ claim 1 wherein the amino acid present in the nucleotide binding site is an amino acid in a loop between helix Y and helix Z and/or an amino acid in a loop between helix Z and helix AA.

7. The RNA polymerase of ~~any one of claims 1-6,~~ claim 1 which has been modified so that the ability for incorporating 3'-deoxyribonucleotides and derivatives thereof should be increased by twice in comparison with the wild type.

8. The RNA polymerase of ~~any one of claims 1-7,~~ claim 1 which is derived from T7 phage, T3 phage, SP6 phage, or K11 phage.

9. An RNA polymerase consisting of a wild type RNA polymerase provided that at least one of amino acids present in a region of the wild type RNA polymerase corresponding to amino acid residues 641-667 of RNA polymerase derived from T7 phage has been modified.

10. The RNA polymerase of ~~any one of claims 1-9,~~ claim 1 wherein the modified wild type RNA polymerase has further substitution, insertion or deletion of amino acid other than the

modification.

11. An RNA polymerase which is an RNA polymerase derived from T7 phage, and has tyrosine at amino acid residue 644 or 667.

12. The RNA polymerase of claim 11, wherein the RNA polymerase derived from T7 phage has further substitution, insertion, or deletion of amino acid other than the amino acid residues 644 and 667.

13. An RNA polymerase consisting of a wild type T7 RNA polymerase provided that 644th amino acid residue of the wild type T7 RNA polymerase, phenylalanine, has been replaced with tyrosine.

14. An RNA polymerase consisting of a wild type T7 RNA polymerase provided that 667th amino acid residue, phenylalanine, of the wild type T7 RNA polymerase has been replaced with tyrosine.

15. The RNA polymerase of ~~claim 13 or 14,~~ claim 13 wherein 665th amino acid residue, leucine, of the wild type T7 RNA polymerase has been replaced with proline.

16. An RNA polymerase consisting of a wild type T7 RNA polymerase provided that 644th amino acid residue, phenylalanine, of the wild type T7 RNA polymerase has been replaced with tyrosine, and 667th amino acid residue, phenylalanine, of the wild type T7 RNA polymerase has been replaced with tyrosine.

17. The RNA polymerase of claim 16, wherein 665th amino acid residue, leucine, of the wild type T7 RNA polymerase has been replaced with proline.

18. An RNA polymerase which is an RNA polymerase derived from T3 phage, and has tyrosine at amino acid residue 645 or 668.

19. The RNA polymerase of claim 18, wherein the RNA polymerase derived from T3 phage has further substitution, insertion, or deletion of amino acid other than the amino acid residues 645 and 668.

20. An RNA polymerase which is an RNA polymerase derived from K11 phage, and has tyrosine at one or more amino acid residues 664-669 and 690.

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21. The RNA polymerase of claim 20, wherein the RNA polymerase derived from K11 phage has further substitution, insertion, or deletion of amino acid other than the amino acid residues 664-669 and 690.

22. An RNA polymerase which is RNA polymerase derived from SP6 phage, and has tyrosine at one or more amino acid residues 633-638 and 670.

23. The RNA polymerase of claim 22, wherein the RNA polymerase derived from SP6 phage has further substitution, insertion, or deletion of amino acid other than the amino acid residues 633-638 and 670.

24. A polynucleotide encoding at least a part of RNA polymerase of ~~any one of claims 1-18.~~ claim 1

25. A method for producing the RNA polymerase of ~~any one of claims 1-23,~~ claim 1 which comprises:

preparing a nucleic acid molecule encoding an RNA polymerase,

introducing a mutation into the nucleic acid molecule so that one or more nucleotides in one or more regions should be changed, and

collecting a modified RNA polymerase expressed by the mutated nucleic acid molecule.